REMARKS

The Office Action was mailed in the present case on September 10, 2002, making a response due on or before December 10, 2002. This response is being submitted, along with a Petition For Extension of Time Within the First Month, and the required extension fee of $110.00 for a large entity. If any additional fee is due for the continued prosecution of this application, please charge the same to Applicant's Deposit Account.

The Examiner has required restriction between claims 1-21 drawn to an asphalt roll roofing or shingle and claims 22-36 drawn to a method of making an asphaltic roll roofing or shingle. Applicant has elected to prosecute claims 1-21, without traverse. Accordingly, claims 22-36 have been cancelled without prejudice toward filing a divisional application.

Applicant's invention involves the addition of hydrated lime, i.e., $Ca(OH)_2$, to asphalt compositions used to make asphalt roofing structures or materials, namely shingles and roll roofing material. More specifically, Applicant is claiming the chemical benefits of adding hydrated lime to an un-modified (non-polymeric) asphalt bitumen, to improve specific end use parameters in roofing applications.

In the discussion which follows, it is important to distinguish between the various forms of "lime" and "limestone" which are discussed in the application and in the various prior art references. Limestone, calcium carbonate, is mined both here and in Europe and is used in various industries in crushed or powdered form. Also, powdered limestone is converted to quicklime (calcium oxide), for example, by roasting in rotary kilns. Powdered quicklime is used for a large variety of industrial applications such as in flue gas desulfurization processes. Powdered quicklime is a highly reactive compound, leading to extra handling precautions and other special requirements of use. For many commercial applications, quicklime is therefore slaked with water to form lime hydrate (calcium hydroxide) either at a central processing location or at a field site. Hydrated lime is easier to handle for many end uses and is added to a variety of industrial and consumer products.

Conventional crushed limestone (calcium carbonate) has been used as a filler in asphalt roofing materials for many years. For example, U.S. Patent No. 5, 391,417 contains a good background discussion of the history of such use. While powdered or crushed limestone is cited as being a "filler" of choice, due to its relatively low cost, the background discussion of the '417 patent reveals that limestone is a poor conductor of heat and tends to deteriorate and discolor roofing shingles.

Applicant has found that the addition of a hydrated lime component, in select percentages, to the aggregate or filler (e.g., rock, sand, fly ash, limestone) in the asphaltic base composition of asphalt roofing structures produces a greatly improved bond between the aggregate/filler, fiber glass matte or other substrate form, and asphalt, especially in the presence of water which has a stronger affinity for the aggregate than the asphalt does. The result of this chemical interaction is improved tear strength and durability in the shingle or roll roofing material. Hydrated lime added to the aggregate is also an effective antistripping agent and has other ancillary positive effects on the asphalt mixture.

The mechanism by which the hydrated lime improves aggregate-asphalt adhesion and moisture sensitivity is not entirely certain. It is theorized that the hydrated lime decreases the interfacial tension between the asphalt and water, thus resulting in good adhesion. It is also thought that the hydrated lime component of the asphalt composition improves the stripping resistance by interacting with the carboxylic acids in the asphalt. This interaction forms insoluble products that are readily adsorbed onto the surface of the aggregate or filler, or in the specific case of roofing materials, the substrate form or web used to make the roofing shingles or roll roofing materials.

The foregoing discussion in intended to emphasize the fact that Applicant uses an additional ingredient in asphalt compositions which are applied to suitable substrates to form asphalt roofing structures. This additional ingredient is that particular form of "lime" known chemically as "hydrated lime", i.e., a chemical compound selected from a group consisting of $Ca(OH)_2$, $Mg(OH)_2$, and $Ca(OH)_2{\cdot}Mg(OH)_2$ (amended Claim 1). This additional ingredient is used in a specific range (1-10%, preferably 3-5% by weight of asphalt) and performs a function which differs from traditional "limestone" and other types of "filler" materials.

Traditional fillers are relatively cheap bulk constituents that form a co-ingredient with the asphalt constituent of the composition. Fillers may be chosen which are intentionally relatively inert since they are not chemically reacting with the other constituents of the composition but function more as space fillers in making up a part of the bulk of the asphalt composition. By way of example, Applicant's compositions typically may contain 40-70% of the asphalt mix of a filler such as powdered limestone or dolomite (Background of the Specification, page 3, lines 30-31).

Claim 12 differs from Claim 1 in that the hydrated lime in the final roofing structure is formed "in situ" by adding quicklime to either the damp aggregate or to the mix of asphalt and water, thereby allowing the quicklime to be chemically converted to hydrated lime.

The Examiner has initially rejected Applicant's independent Claims 1 and 12 under 35 U.S.C. Section 103(a) based upon the reference to George in view of Anthenien. George shows a prior art asphalt roofing structure containing the traditional constituents of an asphaltic base and filler which are applied to a substrate form. However, George fails to teach the advantage of adding the additional component of hydrated lime, which is basically the point of Applicant's invention.

Anthenien is then cited to show the addition of hydrated lime to an asphalt composition which can be used in roofing applications. The Examiner also notes that hydrated lime is a known form of an alkaline earth metal hydroxide as discussed in the Background of Applicant's Specification. The Examiner argues that Applicant's remaining claim limitations are product by process in nature and thus not further limiting to composition of matter claims. The combination of Anthenien with George is argued to be "obvious" in view of the statement in George that the substrate be saturated to the greatest extent possible. The Anthenien teaching is also cited for the use of the numerical range of 1.5-5.7 % hydrated lime (col. 2, lines 19-23 of Anthenien).

Applicant's Claims 5-7 and 16-18 are rejected based upon George and Anthenien and further in view of Applicant's background discussion of known filler materials.

Applicant's independent claims are rejected based on the alternative ground of the combined teaching of George with Karacsonyi. The Karacsonyi reference is cited for a teaching of the use of an alkaline earth metal hydroxide and a filler in asphalt roof compositions.

Applicant's Claims 5,7,16 and 18 are rejected based upon the teaching of George in view of Karacsonyi and based on Applicant's background discussion of known filler materials.

Applicant' independent Claims 1 and 12 are also rejected based upon George in view of either the Little patent or WO publication. The Little references are cited to show an asphalt composition containing an alkaline earth metal hydroxide for anti-stripping properties.

For the reasons which follow, Applicant respectfully traverses the above rejections and asks for the Examiner's reconsideration of the remaining amended claims.

The George reference is a mere restatement of the existing state of the art in asphalt roofing compositions. Thus, Applicant's teaching of the advantages of the use of an additional component, namely the hydrated lime component must be found in one of the supplemental references, the first of which is the Anthenien reference. The Anthenien reference describes the addition of hydrated lime to an acrylic emulsion, the acrylic emulsion being added to asphalt roofing materials to make it workable at ambient temperatures. The emphasis of the patent is to produce a polymer modified asphalt so that the asphalt does not have to be heated to make it flowable. As stated in Anthenien, "A primary objective of the instant invention is to provide a process of manufacturing an improved asphaltic compound which may be carried out at ambient air temperatures with a very fast reaction time." Applicant's claimed compositions do not contain any polymeric additions, do not claim fast reaction times and do not claim to process the asphaltic materials at ambient temperature. In fact, Applicant's independent claims have been amended to make clear that the asphaltic constituents are "heated." Applicant has replaced the indefinite term "hot" with "heated" to make clear that Applicant's compositions are heated above ambient and thus differ in makeup from those of Anthenien.

The Karacsonyi reference is directed toward the preparation of "aqueous bituminous dispersions" which eliminates the need for an emulsifier. While the reference refers generally to materials used in the construction industry, it is not specifically directed to an "asphalt roofing structure", namely a roofing shingle or roll roofing material, as is Applicant's invention. While these bituminous emulsions might be useful, for example, as roof sealants, there is no reason to assume that they would be useful for Applicant's intended application of roofing "structures" as specifically defined in Applicant's Specification.

The final references which the Examiner relies upon to combine with George to arrive at Applicant's invention are the Little references, both of which contain the same teaching. The Little references deal with hot mix asphalts used for "road paving" applications. The references, which are assigned to the assignee of the present invention, are directed to the order of addition of the ingredients which promotes adhesion between the asphalt and filler and exhibits antistripping qualities. However, the teaching of the reference is not directed toward traditional "roofing" materials of the type envisioned by George and by Applicant.

To summarize, not even a combination of the references suggests Applicant's claimed compositions which include the additional ingredient of a "hydrated lime" component to a traditional asphalt roofing composition in order to increase the tear strength and durability of such compositions (as shown by the examples and data in Applicant's Specification). The secondary references cited by the Examiner for particular fillers, etc., cannot make up the deficiency in the teaching of George, even in view of its combination with Anthenien, Karacosonyi or the Little references.

Accordingly, Claims 1, 3-12 and 14-21 are thought to be allowable over the art of record and an early notification of the same would be appreciated.

Respectfully submitted,

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Replacement Abstract:

ABSTRACT

An asphalt roofing structure in the form of either a roll or a shingle is made up of an asphaltic base and a filler which are applied to a substrate form. The composition used to make roofing structure also contains from 1 to 10% of hydrated lime which imparts improved strength and durability to the composition. The hydrated lime can be added directly to the asphaltic base of the composition either with the filler, or with filler added after mixing the asphalt and hydrated lime.

CLAIMS WITH UNDERLINING AND BRACKETS:

1. (Once amended) An asphalt roofing [composition in the form of a roll or a shingle-like] structure, comprising:

a substrate form selected from the group consisting of roll roofing and shingle substrates;

an asphalt composition applied to the substrate form, the asphalt composition comprising [in which] a [hot] heated mixture of an asphaltic base and filler [is applied to a the substrate form,] ; and

wherein the asphalt composition also has included therein an amount of hydrated lime sufficient to improve tear strength and durability properties of the asphalt structure, the hydrated lime comprising [comprises an amount of] an alkaline earth metal hydroxide [in order to impart strength and durability to the composition] selected from a group consisting of $Ca(OH)_2$, $Mg(OH)_2$, and $Ca(OH)_2 \cdot Mg(OH)_2$.

2. (Cancel) The composition of Claim 1, wherein the alkaline earth metal hydroxide is selected from a group consisting of $Ca(OH)_2$, $Mg(OH)_2$, and $Ca(OH)_2 \cdot Mg(OH)_2$.

3. (Once amended) The asphalt roofing structure composition of Claim 1, wherein the alkaline earth metal hydroxide is between [about] 1-10% by weight of asphalt.

4. (Once amended) The composition of Claim 1, wherein the alkaline earth metal hydroxide is between [about] 3-5% by weight of asphalt.

5. The composition of Claim 1, wherein the filler is fly ash.

6. The composition of Claim 1, wherein the filler is $CaCO_3$.

7. The composition of Claim 1, wherein the filler is $MgCO_3$ or $MgCO_2 \cdot CaCO_3$.

8. (Once amended) The composition of Claim 1, wherein the alkaline earth metal hydroxide is first added directly to the asphaltic base of the asphalt composition.

9. (Once amended) The composition of Claim 1, wherein the alkaline earth metal hydroxide is first added directly to the filler of the asphalt composition.

10. (Once amended) The composition of Claim 1, wherein the alkaline earth metal is added first to the filler then to the asphaltic base of the asphalt composition.

11. (Once amended) The composition of Claim 1, wherein the asphalt composition is between [about] 30% to 60% asphalt by weight.

12. (Once amended) An asphalt roofing [composition in the form of a roll or a shingle-like] structure, comprising:

a substrate form selected from the group consisting of roll roofing and shingle substrates;

an asphalt composition applied to the substrate form, the asphalt composition comprising [in which] a [hot] heated mixture of an asphaltic base, filler, and water [is applied to a substrate form,] ; and

wherein the asphalt composition also has included therein an amount of hydrated lime sufficient to improve tear strength and durability properties of the asphalt structure, the hydrated lime being formed by the addition of [comprises an amount of] an alkaline earth metal oxide to the asphaltic base, the alkaline earth metal oxide being selected from the group consisting of CaO, MgO, and $CaO \cdot MgO$ [in order to impart strength and durability to the composition], the alkaline earth metal oxide reacting with water in the filler to produce the corresponding alkaline earth metal hydroxide.

13. (Cancel) The composition of Claim 12, wherein the alkaline earth metal oxide is selected from a group consisting of CaO, MgO, and CaO·MgO.

14. (Once amended) The composition of Claim 12, wherein the alkaline earth metal oxide is between [about] 1-10% by weight of asphalt.

15. (Once amended) The composition of Claim 12, wherein the alkaline earth metal oxide is between [about] 3-5% by weight of asphalt.

16. The composition of Claim 12, wherein the filler is fly ash.

17. The composition of Claim 12, wherein the filler is $CaCO_3$.

18. The composition of Claim 12, wherein the filler is $MgCO_3$ or $MgCO_2 \cdot CaCO_3$.

19. (Once amended) The composition of Claim 12, wherein the alkaline earth metal oxide is first added directly to the asphaltic base of the asphalt composition.

20. (Once amended) The composition of Claim 12, wherein the alkaline earth metal oxide is added first to the filler with water, the oxide and water thus reacting to form the corresponding hydroxide, the hydroxide and filler then being added to the asphaltic base of the asphalt composition.

21. (Once amended) The composition of Claim 12, wherein the asphalt composition is between [about] 30% to 60% asphalt by weight.